SCIENCE

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Vérité sans peur.

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FRIDAY, JANUARY 2, 1885.

COMMENT AND CRITICISM.

THE AWARD by the Royal society of London of the highest honor in its gift, the Copley medal, to Professor Carl Ludwig of Leipzig, has been the cause of much rejoicing among English physiologists. Since John Hunter received the medal nearly one hundred years ago (1787), no physiologist has so merited it by fruitful, lifelong devotion to the advancement of knowledge. Ludwig's first research was published in 1844; and still every year important investigations, inspired, directed, and often personally executed by him, are published from his laboratory. His work extends over nearly every branch of physiology, but we can here refer only to one or two of his more epoch-marking works. In 1850, by the discovery of secretory nerves, he added a new territory to the domain of experimental physiology. That wonderful series of researches on the circulatory mechanism, which commenced in 1847 with a paper on the influence of the respiratory movements on the blood-flow in the aorta, has continued to this day, almost every year adding something from the master's hand. The introduction of the graphic method into physiological experimentation we also owe to Ludwig; and he who would ask what the value of this has been, may be referred to almost the whole of modern experimental physiology for his answer.

Nearly all of the present generation of British physiologists have been students in the Leipzig laboratory. While there, they could not fail to acquire a warm personal affection for its director. Simple, kindly, possessed of a genial humor which never wounds, enthusiastic in his work, and ever ready with aid and counsel, Ludwig must be beloved by those who work under him: hence, to their pleasure in a worthy bestowal of the Copley medal, English physiologists have the further joy of seeing a beloved master publicly honored. In both these respects they will have many warm sympathizers in the United States. For years the Leipzig laboratory has been the headquarters abroad of young American as well as English physiologists; and at present Ludwig is represented by pupils on the physiological staff of the Harvard medical school, of the University of Pennsylvania, of the Johns Hopkins university, of the University of Michigan, and probably of other American institutions. In fact, so far as physiology is now pursued and taught in this country as a definite independent science, and not as a mere body of more or less dubious dogmas which custom makes it necessary to include in the medical student's curriculum, it is, for the most part, pursued and taught by or under the direction of those who have been Ludwig's pupils. In their name we congratulate the master, and express the hope that he may yet be spared for many years to carry on his work.

WE HAVE had occasion twice during the past year to remonstrate against the methods employed by certain book-dealers in bringing out quasi-scientific books. In June, mention was made of several volumes that appeared without date. In November it was the question of more sincere discrimination on the part of publishers in regard to the quality of the material that they recommend to the purchasing public. Now, the little book on meteorology mentioned in our notes provokes protest against the practice of borrowing illustrations and extracts without acknowledgment of their sources.

There are four plates in the first part of this book, the only pictures it contains; and they are all taken from the work on storms by Blasius. In the 'Scholia' of the second part, there are several papers by well-known meteorologists: some of them are credited to their original place of publication; but several others are appropriated, in a more or less condensed form, with their author's name at the head of each, as if, in distinction to the first, these were written expressly for this book. It may be that the omission of acknowledgment results simply from carelessness; but, in any case, it is not to be lightly excused. Why should not professors demand as much care in these matters from their publishers as from their students?

LETTERS TO THE EDITOR.

Why is water considered ghost-proof?

As a possible partial explanation of the fact referred to by Dr. Edward B. Tylor, in his address before the Anthropological society of Washington (see *Science*, iv. 548, col. 2), of the wide-spread belief among savages 'that water is impassable to spirits,' the obstacle which it presents to dogs in pursuing their prey by scent may be suggested. This latter fact must be well known to most uncivilized races; and the mystery of tracking by scent must furnish a fertile theme for the exercise of the savage imagination, while the scent itself of a human being would be readily attributed to his spirit. Can anthropologists show any 'historical connection' between the fact and the belief? Lester F. Ward.

Hollyhock-disease and the cotton-plant.

The hollyhock-disease has been a bane to European gardeners for ten years past. It is one of the most destructive of plant-diseases; being able to kill young plants within a week from the time of its attack, and making sad havoc wherever it appears. It is a parasitic rust (Puccinia malvacearum Mont.) to be associated with the rusts of wheat and oats, and is not confined to hollyhocks, but attacks many other members of the mallow family, such as the upright mallow in particular, marsh mallow, German Lavatera, the common weed known as Indian mallow or velvet-leaf, and many others. Winter gives a list of twenty-four species.

The disease was introduced into Europe from Chili in 1869, appearing first in Spain. In four years it had spread through France and the southern portions of Germany and England, reaching northern Germany in 1874, and Ireland in 1875. It has also appeared in Australia and the Cape of Good Hope, but has not yet, in all probability, invaded North America. The plant reported under this name from California is doubtless another species, as I am informed by Dr. Farlow, who has examined Californian specimens, although not those of the original collector. The mention by Burrill of its introduction into this country is an error, as I have learned from the author. A disease sometimes spoken of in American journals under this name is due to an entirely different cause.

Its introduction from Europe, which is most likely to occur through the importation of hollyhock-seeds, should be guarded against. But a still greater interest attaches to the disease in regard to its possible relation to the future of the cotton industry. The cotton-plant is a member of the mallow family, and, so far as one may judge *a priori*, would fall a ready prey to the disease. It occurred to me to obtain some disease-spores from Europe, and test their growth on cotton; but, fearing the disease might escape from my control, I finally interested my friend, Mr. Charles B. Plowright of King's Lynn, Eng., in the subject, who offered to undertake the necessary experiments.

Mr. Plowright reports, under date of Nov. 26, as follows:—

"Six young cotton-seedlings were, on July 12, infected with germinating-spores of Puccinia malvacearum. The plants were quite young, and the spores were applied to the cotyledons. No result.

"Six young cotton-plants which possessed true leaves were, on June 19, infected with P. malvacearum. No result. June 29, infected same plants again. No result.

"In July these plants were planted out in the garden; and beside them a healthy specimen of Malva sylvestris was also planted. At the beginning of August, four small Malvae, affected with the Puccinia, were planted so near the cottons and healthy mallow that the diseased foliage of the one touched the healthy foliage of the other.

"Aug. 20. The healthy mallow has become affected with the Puccinia: the cottons have not. The plants were left growing together to the end of summer, but the cotton-plants remained free from the Puccinia until they died from the cold of autumn some time in October."

It is a relief to find that our apprehensions regarding the dire consequences that might follow the introduction of this destructive rust are without foundation, so far as the cotton-plant is concerned. The mallow family is divided into two tribes; the first including the true mallows, and the second the rose mallows. Among the best-known members of the latter are the shrubby Althaea, okra, and cotton. I am unable to find any record of any of this tribe taking the disease, and it is probable that the true mallows only are subject to it. J. C. Arthur.

N.Y. agric. exper. station, Geneva, N.Y.

Military cetology.

In the exhaustive essay upon brush-making, by Capt. A. L. Varney, in the last report of the secretary of war (vol. iii. p. 190), I find, in connection with much information of interest to the zoölogist, some remarks upon cetaceans which are unique in their way, and show how dangerous it is for one unacquainted with a subject to attempt to instruct others therein. After stating that "whalebone, or baleen, is a horny substance, consisting of fibrous laminae *laid lengthwise along the upper jaw of the whale*," our author proceeds to give the following information about the order Cetacea in general:—

"Zoölogically, whales, or mammalia of the cetacean order, are divided into two great families,—'blowing' cetacea, so called from the habit of spouting water through the nasal openings or spiracles in the top of the head; and 'herbivorous' cetacea (Manati). The family of 'blowing' cetacea is divided into two tribes,—the tribe of whales (Balaena); and the dolphin tribe, distinguished mainly by the size and shape of the head.

"The whale tribe (Balaenidae) is divided into the genus whale and the genus cachalot (sperm whale). The genus whale produces the baleen," etc.

This travesty of truth was evidently compiled from text-books of fifty years ago, and, although somewhat amusing from its complete erroneousness, cannot be too severely criticised. Cetology is certainly not in so advanced a condition as could be wished; but there are numerous recent works in which the outlines of the subject are correctly laid down, and from which our author might have gathered facts, and not fictions, with which to preface his chapter upon whalebone.

FREDERICK W. TRUE.

U. S. national museum.

Man in the stone age.

In *Science*, iv. 469, Prof. Henry W. Haynes takes me up sharply in reference to an opinion I expressed about the epoch of the appearance of man, properly so called, in prehistoric time in Europe, and calls this opinion 'a most amazing travesty of the views of Mortillet.'

Professor Haynes tells us that he gave a critical notice of Mortillet's work, 'Le préhistorique; antiquité de l'homme,' in *Science:* it is probable, therefore, that he read that book. But it is evident, that, if he did, he has forgotten it: otherwise he would not repeat that Mortillet takes the station St. Acheul as typical of the oldest stone age, inasmuch as he definitely rejects it as being of mixed later types, and substitutes the station of Chelles (*op. cit.*, 133). He would also have remembered that Mortillet denies, in so many words, that the anthropoid then living was man as we understand the term. These words are, "Nous nous retrouvons, donc, en présence de l'anthropopithèque, dont j'ai démontré l'existence," etc. (p. 248). Passing to the next age or epoch, the Moustérien, he asserts that it, too, was characterized by this race of anthropopitheci (p. 339); while in the third epoch, that of Iolutré, he leaves the question open, denying that any traces of man or anthropoid have been discovered (p. 392).

This brings us late, very late, in paleolithic time, without an osteologic trace of any being who should properly be called *man;* for it would indeed be a travesty to apply that name to a creature without language, without religion, and without social compacts. If the question is to be any thing beyond one of word-splitting, these psychological characteristics must be connoted by the word 'man;' for in all ethnological study they almost alone occupy us, as Peschel has well shown in his chapter, 'Die stellung des menschen in der schöpfung' (Völkerkunde, einleitung). Yet Mortillet himself denies them to his anthropopithecus. DANIEL G. BRINTON, M.D.

Media, Penn., Dec. 13.

Dr. Haacke's discovery of the eggs of Echidna.

In the *Zoologischer anzeiger* of Dec. 1 appears an extremely interesting letter from Dr. Wilhelm Haacke, director of the South-Australian museum at Adelaide. It is dated Sept. 8, and contains an account of the writer's independent discovery of the oviparous character of the monotremes four days before Professor Liversedge transmitted Mr. Caldwell's famous cable from Queensland.

On Aug. 3 last, Dr. Haacke received from Kangaroo Island, a point about one day's journey from Adelaide, a living female Echidna hystrix. With the deliberateness characteristic of his race, he did not examine the animal until Aug. 25. He then ascertained that there were two lateral folds of the mammary pouch, in one of which he felt a small object. In the expectation of finding a young Echidna, he brought it to light; and, to his astonishment, it proved to be an egg, with a membranous shell like that of some of the reptiles, and measuring about two centimetres in diameter. Owing, probably, to the long confinement of the animal, the egg was decomposed, and broke apart under a slight pressure.

On Sept. 2 this important discovery was quietly communicated to a meeting of the Royal society of South Australia; and the Adelaide *Advertiser* of Sept. 4, also the *Register* of Sept. 5, published the fact in their reports of the meeting. In the same number of the *Register* appeared a cable-message from London, announcing Mr. Caldwell's discovery of the eggs of Ornithorhynchus; in which message, probably through a telegraph-operator's error, the word 'viviparous' had been substituted for 'oviparous.' Dr. Haacke immediately wrote to the *Register* in a letter printed on the 6th, pointing out the probable error, and the singular coincidence of the independent discoveries of Mr. Caldwell and himself.

On Sept. 7 the *Register* published an extended account of Mr. Caldwell's researches in Australia, and added in a shorter note, —

"It may also be observed that the announcement which has caused such a sensation among European scientists was made from Queensland on Aug. 29, or a few days after the discovery by Dr. Haacke."

Dr. Haacke closes his paper in the *Anzeiger* with an expression of pleasure that his discovery had met with such an unexpectedly rapid confirmation at the hands of another observer.

This adds another to the numerous coincidences in the history of scientific discoveries. When it is remembered that Mr. Caldwell, at the time of his discovery, was in the interior, and may have been some distance from any telegraphic station, it seems probable that his observation and Dr. Haacke's were only a day or so apart. At all events, each investigator is entitled to the full credit of independent discovery, or perhaps, in view of Professor Gill's recent letter to *Science* on this subject, we may better say confirmation of an old truth that has been disregarded for half a century. After so long a period of ignorance regarding this most important question concerning the monotremes, it is certainly very extraordinary that at points so distant from each other there should have been made, simultaneously, observations upon different genera, either of which practically solved the question for all time.

HENRY F. OSBORN.

Princeton, N.J., Dec. 19.

Artificial wampum.

During a discussion upon wampum, at the Montreal meeting of the British association, I alluded to the fact that there is a wampum manufactory at Paskack, N.J. In the same discussion Major Powell remarked, that, according to his belief, none of the cylindrical beads of which the belts then on exhibition were composed had been made by Indians.

Since my return I have visited the manufactory mentioned above, and I will give a hasty sketch of the same. It is situated at Paskack, on the Hackensack River, and is conducted by four 'Campbell brothers,' the youngest of whom is about seventy years of age.

According to their account, the business has been in their family about four generations. During the life of their grandfather it was situated at Tenack, now Edgewater; and my informant remembers when his grandfather used to go in a boat to Rockaway, and

return with his boat loaded with clams, the meat of which was given to the country-people in return for opening the shells, as they were ruined by boiling. The blue 'heart' of the clam, as it was called, was cut out, and made up into the beads used for the ground-work of belts. My informant said, further, that he had often paid out thousands of dollars per week, buying the beads of the white country-people, who manufactured them in their several homes. The hole of the bead was made with an 'arm drill,' and the beads were polished or rounded on grindstones. He says the white beads cannot be made from clam, but from conch shells, which they have always imported from the West Indies. The young clams cannot be used, and the old have so decreased in number that this branch of the industry has been greatly reduced.

I had with me an Iroquois wampum belt, bearing the marks of age, which they immediately pronounced to have been made after their manner. Although they had been familiar with Indians, they had never known of their making the beads. They had always depended upon the trappers for their market, and related incidents connected with their dealings with 'fur companies,' etc. The conch-shell is used also in the manufacture of the pipe beads, rosettes, etc. The holes in the pieces composing the rosettes are drilled, some of them, by the country-women in the vicinity. Specimens of the latter I shall take to New Orleans to represent a minute branch of the industry.

If desired, I will resume this subject at a future time, and will present other proofs which go far towards supporting the statement made by the director of the Bureau of ethnology.

Erminnie A. Smith.

Was it imagination?

The note on artificial auroras, in *Science* for Nov. 14, reminds me of an experience which occurred to myself and party on a mountain summit two or three years ago. There was an unusually brilliant aurora, and it was remarked by several that the streamers seemed to be very near us; and presently, as we stood in the open air with heads uncovered, we began to feel the sensations produced by proximity to a body charged with electricity. The fact that such a sensation had actually been produced by the aurora, was doubted by some scientific men to whom I mentioned it; and it was attributed to *imagination*, which, I fear, is guilty of much, and often accused of more. My object now is chiefly to inquire whether others have had a similar experience. If, during the exhibition of an aurora, such an artificial pillar of light can be formed, I see no reason for doubting the evidence of my own senses; which, by the way, was so definite, and so distinctly perceived, that I could not doubt it if I desired to do so. E. T. Quimby.

THE MANAGERS TO THE READERS.

It is not often that the managers of this journal feel disposed to address their readers with editorial directness. Our principal duty is to record with fidelity and promptness the progress of science, and to make such comments upon its achievements as will enable intelligent people to follow with ease the course of inquiry in departments which are remote from their daily avocations. But the opening of a fifth volume furnishes us an opportunity for a few retrospective and prospective observations.

We have successfully passed what is sometimes called 'the dangerous second year.' A more intimate acquaintance with our staff of contributors, and a more accurate knowledge of the requirements of our readers, have enabled us from time to time to modify our original plans, and to adapt them more closely to the actual scientific condition of the country.

We are constantly exposed to contrary tendencies. The cry often reaches us for 'more popular' articles. The public appetite, which has been whetted for half a century by museums, lectures, magazines, books, and tracts, revealing the 'wonders of science,' 'the curiosities' of nature, the mysteries of the microscope, the magnitudes of the telescope, and other like marvels, calls upon us to give more entertaining and sometimes more sensational papers. When this desire is somewhat moderated, it still looks for novelties, surprising discoveries, extraordinary announcements, and is liable to disappointment if our weekly issue appears with 'nothing striking in it.' On the other hand, the teachers and leaders of science would generally be glad to have this journal become more scientific, and less popular, by printing longer papers than we commonly offer, more abstracts of important memoirs, more elaborate discussions of controverted points. Between these two opposing tendencies, it is no easy task to keep a steady course. A brief recapitulation of our principles may enable our readers to understand our position.

In the first place, *Science* aims to gather from original American sources early and trustworthy information in respect to the scientific work which is in progress in every part of this land and under all the various agencies, governmental, institutional, social, and individual. We do all in our power to elicit from the universities, the learned societies, the laboratories, the surveys, the observatories, and the national scientific departments, accurate

and frequent communications in respect to matters which come under their cognizance.

Second, *Science* aims to gather like reports from the best British and foreign sources in respect to the advancement of knowledge in other countries. In respect to work which is done abroad, where there are so many excellent journals, we cannot be so full as we are in respect to the investigations of our own countrymen; but, as science knows no geographical restrictions, our columns are open to intelligence from every part of the globe.

Third, in presenting what we have to say, our purpose is to be brief, as becomes a journal published weekly; alert in selecting those topics which are of the most immediate interest; accurate, or we should soon lose all standing in the scientific world; and readable, by which we mean that the articles written by specialists in their several domains shall be phrased in terms comprehensible, without a dictionary, to those whose studies and pursuits are in very different fields.

Fourth, in the discussion of important questions, or in the expression of opinions on disputed points, *Science* endeavors to be free from the influence of any school or clique, to speak only in the interests of advancing truth, and to suggest such methods as will promote the economical employment and enlargement of scientific funds, the diffusion of sound ideas among the people at large, and the suppression of all needless animosities.

As for the future, we are hopeful. Our arrangements for receiving and printing such communications as we wish to lay before our readers were never better than now. Our contributors, many of whom we have never personally seen, and who are scattered far and wide over this land, have never been in better accord with the editorial staff. Our subscription list is enlarging, and our pages now come before the principal workers in all departments of science. But we are free to add, that if *Science* is to be all that it should be, all that we desire to make it, there must be a more liberal financial support. Those who have furnished the capital requisite to begin and to sustain for a period the publication of a journal which they believed would be of the greatest utility cannot be expected to continue their support indefinitely, unless they are sustained by the cordial support of individuals and associations who are interested, quite as much as the directors of *Science*, in the perpetuation of the influences which we now represent.

We therefore ask our readers and friends, and especially our contributors and subscribers, to continue during a third year their hearty and outspoken good will.

THE KONGO.

TEN years ago Stanley left Zanzibar for the great lakes of eastern Africa, intending, if possible, to cross the continent, and ascertain if the Luluaba of Livingstone was the Kongo. We then knew little of central or western Africa. The courses of the streams and mountains dotted on the map were derived from imagination or the vague reports of natives. Schweinfurth had explored Sudan and Darfur and the western branches of the Nile; but nearly all of Africa south of Algeria, and west of the Nile and the great lakes, was unknown. Since then, Stanley has followed the course of the Kongo nearly two thousand miles, from the great lakes of western Africa to the ocean.

The English have explored the Niger and its tributary, the Benue, nearly to Lake Tschad; while Capt. Cameron has crossed from Zanzibar, south of the watershed of the Kongo, to the Atlantic at Benguela. The Portuguese, under Messrs. Capello and Ivens, and De Serpa Pinto, starting from Benguela, 12° south latitude, about three hundred miles south of the Kongo, have traversed the continent between the 12th and 15th degrees of south latitude, and explored a vast tract of country and the valley of two great rivers running north, but were prevented by the natives from following them to their junction with the Kongo.

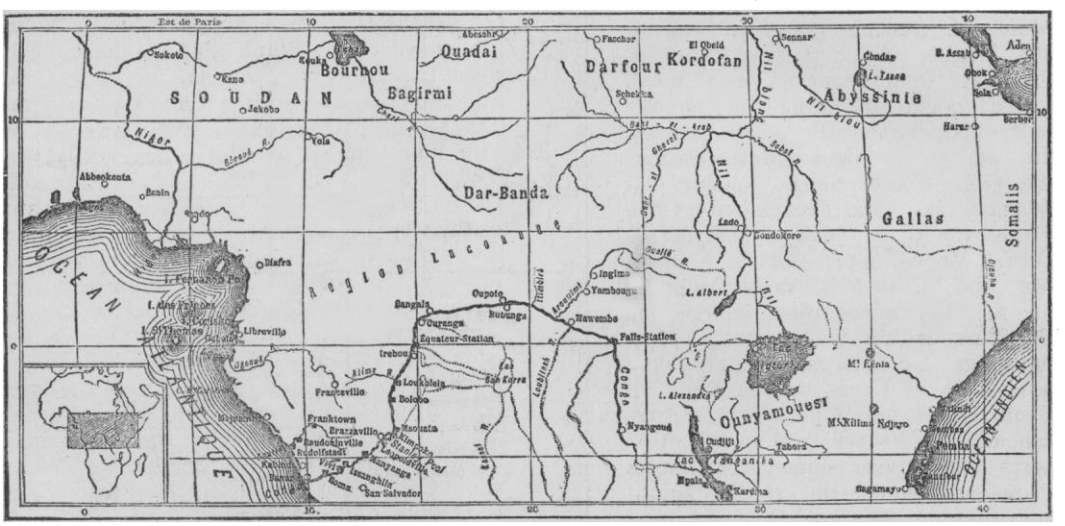
We have now a general knowledge of Africa from 10° north of the equator to the Cape of Good Hope, including central and south Africa; leaving only the territory south of Algeria, the western Sudan beyond Darfur, *terra incognita*. Into this region the French are travelling from Algeria, and the Germans from Egypt; and soon the whole of Africa will be explored, so far as its general features are concerned.

The western coast of Africa has long been

known to the slave-trader and the English cruisers. Since the suppression of the slave-trade, Portuguese, English, Dutch, and French traders have established factories or trading-stations at many places on the coast from 17° north to the Cape. On the Niger and its tributary, the Benue, are many English stations; and small steamers run regularly up and down these rivers, carrying in the cotton of Manchester, and bringing away the products of Africa. Within the last two years the Germans have established trading-stations at three different places on the western coast.

This country has been regarded as the most unhealthy portion of the world, lying under the equator; the soil low and marshy; the climate moist, damp, and malarious; the abode of all kinds of tropical fevers. The Kongo was barred by great falls near its mouth, and was so unhealthy, that out of a party of fifty-one, under English officers, who explored the river in 1816, only one returned alive. Now on the Kongo, above the falls, are between forty and fifty trading-stations, with small steamboats running from Leopoldville on Stanley Pool, three hundred miles from its mouth, to Stanley Falls, nine hundred miles from Leopoldville. While on the coast the country is low, flat, and unhealthy, south of the equator it rises a short distance from the coast, until it reaches a level of from twelve hundred to fifteen hundred feet. The Kongo, king of African rivers, and second only to the Amazon in the volume of its waters, occupies an elevated plateau on both sides of the equator, with a free navigation above Leopoldville, according to Stanley, of 4,520 miles. In its valley there is an abundance of flowing streams. The drinking-water is magnificent; the temperature delightful, the thermometer ranging from 87° at noon, to 60° at two A.M. The land is rich, and adapted to the growth of most tropical and semi-tropical products, among which are India-rubber, gums, sugar, and cotton. The country is probably as healthy as the fertile prairies of our own great west, and capable of raising immense crops of all the tropical productions.

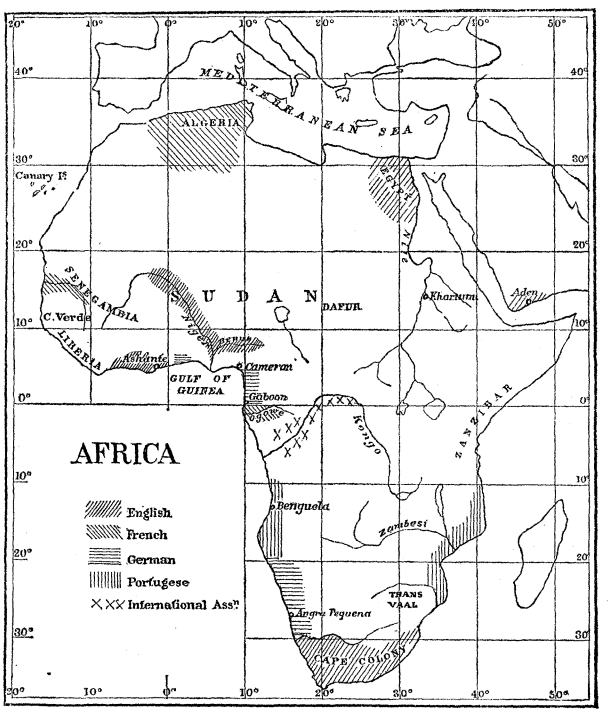
There are two seasons, — a wet and a dry. In the rainy weather a large part of the day is pleasant, storms arise suddenly and with little warning, thunder roars, lightning flashes, wind blows with great fury, rain pours down in sheets of water for an hour or two; then as suddenly the clouds pass away. On the coast the rainy season lasts from November to March; but in the interior, rains commence earlier, and continue later.



CENTRAL AFRICA, WITH THE COURSE OF THE KONGO.

to their travelling through the country, preferring to hold all the trade of the interior in their own hands. The natives in the interior are generally well disposed to the white man, and ready for trade.

Which of the great powers shall control this trade is a question now agitating the civilized world. The Portuguese first discovered the western coast of Africa. They claim the territory from latitude 5° 12′ south to 18° 5′ south, including the mouth of the Kongo River, running from the coast indefinitely into the interior. Their northern boundary-line crosses the Kongo at Isangilla, about one hundred and fifty miles from the mouth. By the right of discovery they claim jurisdiction over the mouth of the Kongo and all commerce passing out of its mouth. The English claim large portions of the coast from about 6° or 8° north to 18° north, including the mouths of the Niger, and the whole country drained by the Niger and the Benue, the Gold Coast, Sierra Leone, and Senegambia. The French claim Cape Verde, the River Senegal (14° to 17° north), Cape Lopez, and the Gaboon from about 4° or 5° north of the equator to as many degrees south. The Germans, within two years past, at the suggestion of Bismarck, have taken possession of Lagos on the Bight of Benin, of Cameroon between the English and the French claims (about 5° north), and a vast country near Angra Pequena, commencing at 23° south, and running to Cape Colony, about 29° south, inland to Transvaal, — a territory said to be as large as Germany, Belgium, and Holland united. They have established over forty factories on the coast.



OUTLINE-MAP OF AFRICA, SHOWING THE PORTIONS OF THE COAST CLAIMED BY EUROPEAN NATIONS.

Almost all the western coast of Africa is now claimed by these four great powers. Portugal claims the exclusive control of the navigation of the Kongo; England, exclusive control of the Niger. A year ago Portugal proposed to make a treaty with England by which the respective rights of these powers to each of these rivers should be recognized. Great opposition was made, both in England and on the continent, to this alliance, and it has been abandoned.

The International association of Africa was formed in 1877 in Belgium, about the time of the return of Mr. Stanley from the 'dark continent.' Its headquarters are in Brussels. The object of the association is to acquire, by treaties with the natives, territory for the use and benefit of free states established under the care and supervision of the association. For this purpose it is declared that no custom-house duties are to be levied upon goods or merchandise brought into the territory, and that no greater rights will be granted to the citizens of one nation than to those of every other; that the Kongo, the great highway into central Africa, shall remain an international river, open to all civilizing influences, and to the legitimate commerce of every land. It is established to promote the public good, not private gain. It has made treaties with many different tribes, and founded thirty stations on the river. At these stations factories are established, and trade carried on by merchants with the natives. This association is unlike any other ever organized. The United States was the first to recognize its nationality, in April, 1884. Since then it has been recognized by several other European nations.

At the invitation of Bismarck, a conference of the leading nations of the world is

in session at Berlin, to establish, if possible, the political status of the association. Many hope that it will ratify the purpose of the association to establish free navigation on the Kongo. The Germans also demand free navigation with international control of the Niger, but are opposed by the English, who claim the exclusive jurisdiction and control, although expressing themselves as ready to grant the free navigation of the river to all nations.

The French, under De Brazza, have opened a line of Atlantic communication with the Kongo by the River Ogowe, near the equator, with stations on the Ogowe and the Kongo; thus obtaining an outlet from the valley of the Kongo, north of the territory claimed by the Portuguese. The stations of the French are generally on the north side of the Kongo, while those of the International association are upon the south.

It now seems as if the valley of the Kongo would be the most densely populated part of Africa. Its climate and soil are favorable for white labor. The great drawback is the falls near the mouth of the river; but, to the elevation of land which produces these falls, it owes its favored position. A railway is proposed from Stanley Pool to Boma, a distance of two hundred miles, — the head of navigation from the ocean. The Niger and the Benue are both navigable from their sources far into the interior, and consequently the land in the immediate valley of these rivers is low and unhealthy; while south of the valley of the Kongo the country is probably broken and mountainous, and therefore less fit for cultivation.

The maritime nations of Europe are seeking for the trade of Africa, but there seems to be nothing to warrant expectations of a large traffic with central Africa at once. The tribes, though numerous, are small and have few wants. One or two generations must pass before they can become even partially civilized, and acquire the needs of civilized life. Emigration from Europe must be slow, as Africa is not so well adapted as America and Australia to European emigrants; and not until America is densely populated will the overflowing emigration from Europe seek the heart of Africa. But the time will come when it will be densely populated, and its long rivers, its many and great falls, its immense lakes and high mountains, become the resort of a vast population.

GARDINER G. HUBBARD.

Washington, Dec. 26.

LAKE MISTASSINI.

PARAGRAPHS are going the rounds of the newspapers, representing that a great lake has recently been discovered in Canada, larger than Ontario, and perhaps as large as Superior itself. If this were true, it would certainly be a matter of great interest, and would naturally lead to the inquiry, how it happened that far-off Lake Superior should have been mapped, with an astonishing approach to general correctness of outline, as early as 1672, while this new lake remained to be discovered more than two hundred years later, notwithstanding the fact that it is at a comparatively short distance from a region where the Jesuits and fur-traders had many posts at the time the Lake Superior map was made.

The immediate cause of the paragraphs in question was undoubtedly a communication made to the geographical section of the British association, at its late meeting in Montreal, by the Rev. Abbé Laflamme, and the reference to this communication by Gen. Sir J. H. Lefroy, in his opening address before the section as chairman of that body. In this address Gen. Lefroy gives the impression that the discovery of this lake is something new and startling. He says, "That it should be left to this day to discover in no very remote part of the north-east a lake rivalling Lake Ontario, if not Lake Superior, in magnitude, is a pleasant example of the surprises geography has in store for its votaries" (*Proc. royal geogr. soc.* for October, 1884, p. 585.). On referring to the communication made to the section by the Rev. Abbé Laflamme, it does not appear, however, that there was any sufficient authority for this statement on the part of the chairman of the section; and, as the matter is one of considerable interest, it may be worth while to look a little more carefully into what is known about the lake in question.

The facts here to be presented will show that we in reality know no more about the size of Lake Mistassini than we did two hundred years ago; the reverend abbé himself, in his communication, doing little more than to say that there is in north-eastern Canada a lake whose dimensions are unknown, but which some persons believe to be of great extent; an 'old trader,' whose name is not given, 'seeing no reason to doubt' that it is 'but little inferior in size to Lake Superior.' There are several statements in the reverend abbé's communication to which exception might be taken; but it is sufficient to call attention to his mistranslation and misconception of the original account of the lake by Father Albanel, who says that it is reported that twenty days would be required to make the tour of it (*pour en faire le tour*). This the Rev. Abbé Laflamme has translated, 'twenty days to *walk* around it;' thus showing a singular misconception of the nature of the only possible means of exploration and communication in a region like that in question.

This lake, called by the first explorer of that region, Father Albanel, '*le lac des Mistassirinins*,' lies on the north side of the watershed between the St. Lawrence and Hudson's Bay, and is represented on nearly every

map of the region as being the head and reservoir of Rupert's River. Its existence was first made known in the *Jesuit relations* for the year 1671–72. The account there given consists mainly of the journal of Father Charles Albanel, who was associated with Monsieur Denys de Saint Simon and 'another Frenchman' in the exploration of the line of communication (apparently well known to the Indians, but which had never before been traversed by white men) between Lake St. John and Hudson Bay. The geographical details given in this account are exceedingly meagre; the chief items in regard to Lake Mistassini being that it is said to be so large that the circuit of it could not be made in less than twenty days of fine weather; that it is full of rocks, from which circumstance its name is derived; and that there was an abundance of fish and game in the vicinity. It does not appear that Father Albanel's party did more than traverse a small arm of this lake, as they were not on it more than one, or possibly two days.

So far as known to the writer, the first delineation of Lake Mistassini is on a map published by Jaillot in 1685, of which a manuscript copy belonging to the Kohl collection is in the State department in Washington, and temporarily, at the present time, in the possession of Mr. Winsor, librarian of Harvard university. It does not appear, however, from Mr. Kohl's notes attached to this map, whether the original was engraved or printed; but it is said to have been almost entirely compiled from original Canadian authorities. On it the lake in question bears the name of 'Ticmagaming.' That it is really the lake now known as Mistassini will be evident from what is said farther on.

This lake also appears under the name of 'Mistasin' on two maps published by H. Moll in 1715 and 1720. Its shape, however, as indicated on these two maps, is not at all like that given on the Jaillot map; neither is it the same on Moll's two maps. It is clear from the way in which it is represented by the latter, and especially from the manner in which the islands are scattered over its surface, promiscuously and very differently in the two maps, that nothing more was known about it by Moll than that there was a large lake in that position in which were several islands.

In Bellin's map (1744), which is found in Charlevoix, the same lake is given with a very different form from that which had been previously indicated. It is represented as forming three nearly parallel bodies of water with a general north-east south-west trend, and connected with each other by comparatively narrow channels. To the most north-western of these bodies of water the name of 'Lac des Mistassins' is given; to the middle one, that of 'Père Albanel;' and to the more easterly one, that of 'Lac Dauphin.'

In the map which forms the geographical basis of the Canada survey (geological) map (1866), this lake (here called 'Mistiashini') appears with a very different shape from that given on the Bellin map, and has the appearance of being in part laid down from surveys. The north-eastern and eastern portions, however, are indicated by a dotted line, from which the inference may be drawn that this part of the lake was unknown. It is a remarkable fact, however, that the form of the lake, as given on the Geological survey map, resembles quite closely that which it has on the Jaillot map, showing pretty clearly that the western side of the lake was laid down by the last-mentioned compiler from actual exploration.

This same outline, given on the Geological survey map in 1866, is repeated without variation on the latest general map of Canada, — that published by Stanford, and said to be Arrowsmith's, with additions and corrections bringing it down to 1880. This would indicate that no additions had been made to our knowledge of the geography of that region during the past twenty years. It is a curious fact, however, that on the Arrowsmith-Stanford map, this lake, called 'Mistassinnie,' is moved just one degree farther to the east than it is on the Geological survey map.

On most of the maps on which the lake is given, it is represented as being some sixty or seventy miles in length, or about half the size of Lake Ontario; although it is clearly evident that its eastern side is unknown, both as to form and position. All that is known about its size, beyond this, is the statement of Père Albanel, that it was reported to be so large that it would require twenty days of pleasant weather to circumnavigate it; and the opinions of certain persons, reported by the Rev. Abbé Laflamme, giving it various dimensions, no clew being given to enable one to decide on the relative weight to be allowed to each person's opinion. The Rev. Abbé Laflamme gives his own statement, that there can be no doubt that Lake Mistassini is larger than Lake Ontario; while the 'old trader,' as already mentioned, says that there is no reason to doubt that it is 'but little inferior in size to Lake Superior.' The positive statement of 'Mr. Burgess' is also added, that the lake is a hundred and fifty miles in length: this would be about fifty miles less than Ontario.

After all, we have, in reference to the dimension of Lake Mistassini, no better evidence to fall back on than that of Father Albanel. What number of miles can be allowed as the equivalent of a tour of twenty days of fine weather, the writer, with the experience of seven summers spent in boating and canoeing on Lakes Superior, Michigan, and Huron, with crews of Indians, half-breeds, and *voyageurs*, is unable to say. An ordinary journey of twenty days in a canoe would, perhaps, carry a traveller around a lake half or two-thirds the size of Ontario, which would coincide with Mr. Burgess's statement.

While it is possible that Lake Mistassini may be considerably larger than Lake Ontario, the probabilities are decidedly in favor of its being somewhat smaller. At all events, geographical information in regard to that region, which does not seem difficult of access, is greatly needed.

It is easy to see from the above that the name of the lake about which this note is written has been spelled in as many different ways as there are authors or cartographers who have had to do with it. The spelling 'Mistassini' is here adopted because it is the

simplest, and because it is that form which has been used in the report of the proceedings of the Montreal meeting in the organ of the Royal geographical society. The present writer has, however, never seen it so spelled on any geographical map. It is spelled in three different ways in the publications of the Canada survey, and in the same number of ways in Stieler's 'Hand-atlas.'

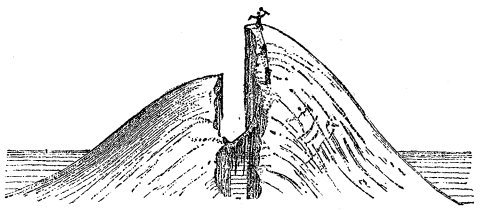
J. D. WHITNEY.

THE TASMAN GLACIER.

A YEAR ago, accounts were published of the attempt in 1882, of Mr. W. S. Green, an Englishman, to ascend Mount Cook, the highest (12,350) of the New-Zealand Alps. He was accompanied by two practised Swiss guides from Grindelwald, and reached a great altitude over snow and ice, but failed in his main object, chiefly on account of bad weather. A somewhat similar exploration was undertaken in March, 1883, by Dr. R. v. Lendenfeld of Christchurch, New Zealand, accompanied by his wife, three shepherds to serve as porters, and a driver for the wagon in which the supplies were carried up to within a few miles of the Tasman glacier. Bad weather on the approach to the mountains was followed by nine days without a cloud, during which a good piece of triangulation was executed, the Hochstetter dome ascended (2,840 m.), and material collected for a fairly detailed map on a scale of 1:80,000. The results of the survey now appear as supplement 75 to *Petermann's mittheilungen* (Der Tasman-gletscher und seine umgebung; Gotha, June, 1884, 80 p.), with a general and local map, a well-executed reproduction of a photograph taken from the medial moraine of the great Tasman glacier, which we copy in reduced form, and several cuts. The glacier was found to be twenty-eight kilometres in length, — three kilometres longer than the Aletsch, the greatest in Switzerland. Its lower part is of moderate slope and slow motion, greatly covered by moraines. Green described the New-Zealand Alps as equalling or exceeding those of Europe in picturesqueness, but Lendenfeld thinks them inferior. The mountain form is less pronounced, the snow-fields are smaller, and the glaciers are much obscured by morainic rubbish: bushes replace pines, and the flat-bottomed valleys are without villages and fields. The summit of the Hochstetter dome, a sharp edge of hard-packed snow, was reached by Lendenfeld, his wife, and one porter, after a daring climb across a delicate ice-bridge, of which the author's rough figure is here copied. Sitting astride

THE NEW-ZEALAND ALPS AS SEEN FROM THE MIDDLE MORAINE OF THE TASMAN GLACIER.

of the ridge, the neighboring peaks rose around them; and all New Zealand, from western to eastern coast, with the ocean beyond on either side, lay below. The



THE TOP OF MOUNT HOCHSTETTER.

story of the journey is simply and graphically told, and suggests a writer of more intelligence and better powers of observation than is usually met with among mountain climbers.

THE DIGESTIBILITY OF CELLULOSE.

IT is a well-established fact, that a considerable portion of the woody fibre which is consumed in such large amounts by herbivorous animals does not re-appear in their excrements, but is apparently digested. In what portion of the alimentary canal, or by means of what secretion, this digestion is accomplished, has been the subject of much speculation and of some experiments; but, until recently, neither had done much to illuminate the matter.

Hofmeister [1] seemed to have gone far towards solving the question when he found that a considerable solution of the cellulose of grass took place in the rumen of sheep. He first enclosed two small samples of fresh grass in cages of german-silver wire covered with muslin, and introduced them into the rumen of a living sheep. After three days the animal was killed, the cages removed, and their contents examined. It was found that seventy-eight and four-tenths per cent of the woody fibre originally present had been dissolved. Subsequent experiments showed that the fluid obtained from the rumen of a freshly killed sheep had also a powerful solvent action on woody fibre, and that the mixed saliva had likewise this power. Experiments on oxen gave no decisive result: those on the horse failed to show any solvent action of the saliva upon woody fibre. Hay, and the 'crude fibre' prepared in the analysis of fodders, were acted upon by the fluid from sheep's rumen, though not so energetically as was the grass.

These results point unmistakably to the first stomach of ruminants as one place where cellulose is digested. Hofmeister ascribes to the mixed saliva the power of dissolving it; but some subsequent experiments by Tappeiner [2] indicate that this is effected by a fermentative process, and that the saliva or fluid from the rumen used by Hofmeister served simply to supply food to the organisms concerned in the fermentation. Tappeiner took samples of the contents of rumen, small intestine, and large intestine, of a ruminant fed exclusively on hay. One sample from each portion of the alimentary canal was at once boiled; to a second some antiseptic (chloroform, thymol) was added, sufficient to stop the action of organized ferments; while to the third nothing was added. All were kept warm, and after a time their content of crude fibre was determined. Those portions from the rumen and large intestine, to which nothing was added, were found to have lost cellulose, while carbonic acid and marsh-gas were evolved. No loss was observed from the contents of the small intestines, nor from the samples treated with antiseptics. Further experiments showed that this fermentation could be produced outside the body. To hay or pure cellulose, mixed with extract of meat, and previously heated to 110° C., a drop of fluid from the rumen was added. After a few days, active fermentation began. Gas was freely evolved, consisting of about seventy-six per cent of carbonic acid and twenty-four per cent of marsh-gas, and the cellulose nearly all disappeared. A second kind of fermentation was also observed, which yielded carbonic acid and hydrogen. In both kinds of fermentation, only the smaller part of the cellulose was volatilized, most of it being converted into acids of the fatty series.

That cellulose is fermentable is not a new observation; Van Tieghem having found that the butyric ferment has the power of decomposing it, with production of hydrogen, carbonic acid, and butyric acid. Tappeiner's experiments are of interest, because they show that the fermentation takes place also in the alimentary canal. This is shown not only by the disappearance of the cellulose in the experiments described above, but also by the presence of the products of the fermentation in stomach and intestines. In ruminants the marsh-gas fermentation seems to prevail. In the stomach of the horse and swine considerable quantities of hydrogen were found. In both cases acetic acid, aldehyde, and an acid having the composition of butyric acid, were found.

These results are important in their bearing on our estimates of the nutritive value of fodders. It having been shown that the digestible portion of the crude fibre has the composition of starch, it has generally been assumed to have the same nutritive value. Tappeiner's experiments show that this is probably not the case. There appears to be a disposition on the part of some critics, however, to rush to the opposite extreme, and, instead of overestimating the nutritive value of cellulose, to underestimate it. The non-nitrogenous nutrients are to be regarded as the fuel of the body, and they are of worth to it in proportion to the amount of energy set free by their oxidation to carbonic acid and water. So far as we can see, it is a matter of indifference whether that oxidation begins in the alimentary canal, or not until the substance has passed into the circulation. Whatever potential energy is contained in the digested cellulose is yielded up to the body sooner or later, with the exception of that portion which escapes in the form of combustible gases. According to Tappeiner, this

[1] *Biedermann's centralblatt*, Jahrg. x. p. 669.

[2] *Thier. chem. ber.*, xi. 303, xii. 266 and 272; *Zeitschr. für biologie*, xx. 52.

portion is small. Since, now, the heat of combustion of cellulose is the same as that of starch, according to von Rechenberg's determinations,[1] the difference in the nutritive value of the two must be measured by the heat of combustion of the marsh-gas and hydrogen evolved.

The well-known experiments of Henneberg and Stohmann on the respiration of sheep showed no considerable excretion of either hydrogen or marsh-gas. In one of them, for example, the animal ate per day 1,216 grams of hay, and excreted 1.5 grams of marsh-gas. Not having at hand the original account of the experiment, we will assume that the hay contained only twenty-five per cent of crude fibre, of which one-half was digested. This amounts to 152 grams per day. This quantity of cellulose, if oxidized to carbonic acid and water, would yield 676,-704 cal.[2] From this we have to deduct the amount of heat carried off in 1.5 grams of marsh-gas, which, according to Favre and Silbermann, amounts to 19,595 cal. There remain 657,109 cal., representing the worth of the 152 grams of cellulose to the animal. The same weight of starch, if completely oxidized, would yield 680,808 cal.: in other words, the cellulose set free in the body of the animal ninety-six and a half per cent of the energy which the same weight of starch would have done.

Naturally these calculations are not exact; but they serve to show, that, if the heat liberated during the fermentation of the cellulose is of use to the animal, the nutritive value of cellulose does not fall so much below that of other carbohydrates as some are inclined to believe. H. P. ARMSBY.

IS THE RAINFALL OF KANSAS INCREASING?[3]

THIRTY years ago the territory of Kansas was not occupied by the white man, and, if we except a few acres cultivated by the Delaware Indians, no portion of her soil had been turned up by the plough. Her entire area was included within the vast and almost unknown region of the 'treeless plains' and the 'great American desert.' During that brief intervening period, more than a million people, chiefly of the agricultural class, have taken possession of her domain, and have already brought her to the very front rank of the states of the Union in the extent and value of her agricultural products. History affords no other instance of the permanent occupation of so extensive an area, previously unoccupied by man, by so large an agricultural population, in so short a space of time. Here, certainly, if human agency could anywhere affect climate, would such an effect be produced. Here, assuredly, if settlement ever increases rainfall, will such increase be most marked and most unmistakable. That such increase has actually taken place, I believe to be established beyond a doubt. It is a circumstance peculiarly favorable to the determination of the point in question, that, although the general settlement of Kansas by cultivators of the soil is of such recent date, reliable observations upon the rainfall had been made at the military posts upon the eastern borders for a sufficient period to make possible a satisfactory comparison between the rainfall before settlement and after settlement. The records at Fort Leavenworth cover the longest period, and enable us to compare the nineteen years immediately preceding the occupation of Kansas by white settlers with the nineteen years immediately following such occupation. During the first period the average rainfall was 30.96 inches; during the second period it was 36.21 inches; giving an average increase of 5.21 inches per annum, — an increase of nearly twenty per cent. The Fort Leavenworth records cover so long a period of time (nearly forty years), that the increased average of the second half of the period cannot be attributed to a mere 'accidental variation.' In the issue of *Science* for April 18, 1884, it is stated that "the supposed increase in the rainfall in the dry region beyond the Mississippi is not borne out by the returns of the signal-service." But the records of the signal-service upon which this statement was based include a period of only twelve years of observation (from 1871 to 1882), which is undoubtedly too short a period for either establishing or disproving the fact of a 'secular' variation.

But the fact of an increased Kansas rainfall does not rest entirely upon the Fort Leavenworth observations. There are other stations in Kansas whose records cover a much longer period than that of the longest established regular station of the signal-service. There are the twenty years' records of the U. S. military post at Fort Riley, the twenty four years' records of the State agricultural college at Manhattan, and the seventeen years' records of the State university at Lawrence. If these several periods of observation be divided into two equal parts, in each case it is found that the average rainfall of the second half is notably greater than that of the first half. At Fort Riley the increase amounts to 3.05 inches per annum, and at Manhattan to 5.61 inches per annum, and at Lawrence to 3.06 inches per annum. Expressed in per cent, the rainfall of these three stations has increased in the second half of each period of observation, at Fort Riley, thirteen per cent; at Manhattan, twenty per cent; and at Lawrence, over nine per cent. If the increased rainfall could be shown by the records of a single station only, or if the several stations with sufficiently long periods of observation exhibited discordant results (some indicating a decrease, while others indicate an increase), or if even a single station indicated a diminished rainfall, the fact of a general increase would lack satisfactory demonstration. But the entire agreement of the four stations whose records have been used in a discussion of this question seems to establish beyond doubt the fact of an increased rainfall in the eastern half of Kansas.

There can be no reasonable doubt that the general

[1] *Journ. prakt. chem.*, n. f., xxii. 1 and 223.

[2] 1 cal. = the amount of heat required to raise the temperature of 1 gram of water 1° C.

[3] Lecture before the Kansas academy of sciences, Nov. 25, by Prof. F. H. SNOW.

settlement of the western portion of Kansas will have a similar effect upon its rainfall; but it is not reasonable to expect that western Kansas will ever boast of a rainfall equal to that of eastern Kansas. So long as the eastern half of the state remains to the east of the meridian forming the western boundary of the Gulf of Mexico, the south winds will cause it to receive much larger supplies of vapor, for condensation into rain, than will be received by the western half of the state, which lies beyond the immediate track of the vapor-laden winds. It must be remembered that climatic changes are exceedingly gradual; and a rain deficiency or excess for a single year, or for two or three years in succession, must not be considered as invalidating the law of general averages. Neither should the fact that the rainfall, upon the whole, is increasing, induce settlers to break land in the western third of Kansas with the expectation of successfully raising the same crops as in eastern Kansas. Such settlers will surely be disappointed. It is even doubtful if paying crops of any kind can ever be continuously produced in that region. With an average before settlement of about fifteen inches per annum, the same percentage of increase as has been made in eastern Kansas in thirty years would give an annual amount of less than eighteen inches, — a quantity entirely inadequate to maintain successful agriculture.

AMERICAN SOCIETY FOR PSYCHICAL RESEARCH.

AT a meeting held in Boston, Sept 23, to consider the advisability of the formation of a society for psychical research in America, the whole matter was placed in the hands of a committee of nine, consisting of Dr. G. Stanley Hall of Johns Hopkins university; Prof. E. C. Pickering, director of the Harvard college observatory; Dr. H. P. Bowditch and Dr. C. S. Minot, of the Harvard medical school; Mr. S. H. Scudder, president, and Professor Alpheus Hyatt, curator, of the Boston society of natural history; Professor William James of Harvard college; Professor William Watson of Boston; and Mr. N. D. C. Hodges of Cambridge. This committee held a number of meetings during the months of October and November, and issued an invitation to a number of scientific men throughout the country to join in a society under a constitution upon which they had decided. To this invitation there were favorable replies from about eighty.

The first meeting of the society was held in Boston on the 18th of December. Under the constitution the conduct of the society is placed in the hands of a council of twenty-one, seven to be chosen each year, to hold office three years. Of this council, there were elected at this first meeting, fifteen: Prof. G. Stanley Hall, Prof. George S. Fullerton, Dr. William James, Prof. E. C. Pickering, for three years; Professor Simon Newcomb, Dr. C. S. Minot, Dr. H. P. Bowditch, Mr. N. D. C. Hodges, for two years; Prof. George F. Barker, Mr. S. H. Scudder, Rev. C. C. Everett, Mr. Morefield Storey, Professor John Trowbridge, Professor William Watson, Professor Alpheus Hyatt, for one year.

The sub-committee on work made an informal report, and has since issued a circular to members, asking for volunteers on the investigating committees and for information regarding promising subjects for investigation, such as mediums, mind-readers, mesmeric subjects, etc.

The society adjourned to meet on the ninth day of January.

THE NATURAL BRIDGE OF VIRGINIA.[1]

DURING a recent trip to Virginia (Oct. 2 to 6) I visited the Natural Bridge ; and although in possession of the guide-book of the locality (edition of 1884), and the admirable articles published by Major Jed. Hotchkiss in *The Virginias*, I failed to obtain certain information relating to the bridge, which would be of special interest to the topographer and geologist. Some of the observations which I made, although of a general character, may be of interest.

The bridge is undoubtedly the remnant of the top of a cave which was probably formed long before the Luray cavern, which is excavated out of the same lower Silurian limestone formation. The bridge seems to be located in the centre of a gentle basin or synclinal in the strata, which may account for the roof of the ancient cavern being left at this special point. The height of the bridge has evidently been much augmented by a lowering of the bed of Cedar Creek through the agency of chemical and mechanical erosion after the destruction of the original cavern. The height of the original cavity, at the point where the bridge now exists, was in consequence very much less than the present height of the intrados of the bridge-arch.

The elevation of the railroad-track at Natural-Bridge station, on the Shenandoah valley railroad, is seven hundred and sixty feet above ocean-level; and the elevation of Cedar Creek, under the north face of the bridge-arch, is nine hundred and fifteen feet, as determined by two independent lines of barometric levels which I ran between the railroad-station and the bridge.

The height of the crown of the arch on the north side, at the 'Lookout Point,' is one hundred and eighty-eight feet above the creek, measured with a cotton twine, which was the only line of the required length which could be obtained. The same height measured by the barometer (Short & Mason aluminum aneroid) was determined as one hundred and eighty-six feet. Neither of these methods of measurement is sufficiently exact to permit of a final statement, but the results are of interest in the absence of more definite data.

The thickness of the arch under the crown on the north side is approximately forty-six feet, and on the south side thirty-six feet.

[1] Read before the American philosophical society, Oct. 17, 1884, by CHARLES A. ASHBURNER.

Much has been written and published about this natural bridge, since the appearance, a century ago, of a description of it in the 'Travels of the Marquis de Chastellux in North America in 1780–82;' but there appears to be a lack of a complete description of the bridge and its surroundings, which is readily available, and which would prove of special value to the topographer and the geologist.

HEREDITARY INTELLECT AND THE GEOGRAPHICAL DISTRIBUTION OF TALENTS.

There is hardly any subject more fascinating to men of intellectual pursuits than that of biography. Within the last few years we may almost assert that the foundations have been laid for a science of comparative biography which promises to be not only interesting as a branch of inquiry, but of practical importance to all who are engaged in the education of youth and the advancement of science. The writings of Galton, Ribot, James, and others, have shed a great deal of light upon the influences which tend to produce intellectual distinction; and, if investigations of this kind are far from being so comprehensive or so exact as would be desirable, they are, to say the least, suggestive and stimulating. To books of this class belongs the treatise which is named above. The volume is worthy of a much more extended and critical review than we can now give; but, having received an early copy of it, we bring it at once to the attention of our readers.

Eleven years ago Alphonse de Candolle, the celebrated botanist, who succeeded to the chair of his renowned father in the Academy at Geneva, and to the place of a foreign member of the French institute made vacant by the death of Agassiz, published a history of the modern sciences and of scientific men during the last two centuries. The work has long been out of print. Its venerable author, more than seventy-eight years old, has now issued a revised edition of this work, enlarged by more than a hundred pages of new material. Some portions of the original edition (particularly a defence of Darwin's theory of natural selection, which seemed to the author no longer called for) have been omitted, and in place thereof some new researches in respect to heredity in the human species have been introduced. By what he calls his new method, the author endeavors to distinguish in the facts of birth those which come from heredity, and those which are for the first time manifested in a family, and which may be considered as individual variations. These characteristics, and those developed after birth by exterior influences, determine the adaptation of the individual to the circumstances in which he is found; that is, to his environment.

De Candolle has now carried his inquiry beyond the ranks of those who are commonly called scientific men, — the students of mathematical and natural sciences, — and has made a study of those who are devoted to moral and social sciences.

It is not generally known how well he is fitted for both these lines of investigation. His career has been that of a botanist, but he began life by the study of law; twice he has been a member of constitutional conventions, and repeatedly of legislative bodies. We need say no more to assure the reader that this new edition of his history is fresh, suggestive, and instructive. If all its reasonings are not accepted, the student of comparative psychology must be grateful for the light which it sheds upon one of the most difficult, interesting, and important inquiries which can be made in respect to the intellect of man.

His new method, as he terms it, is this, — to select, without any preconceived notions, a certain number of individuals whose personal characteristics can be ascertained, and those of their parents and grandparents. The characteristics to be noticed are these: 1°, exterior physique; 2°, internal organs, so far as they can be judged without autopsy; 3°, instincts or native disposition; and, 4°, intellectual faculties. Having collected the facts, the influence of heredity can be approximately ascertained. The author first thought of studying the family of some sovereign, — Louis XIV., Frederick the Great, or some one else of whose ancestry there are abundant records; but he finally determined to study his own family. Being seventy-eight years old, he playfully says that he knows himself quite well. Of his parents and grandparents, all of whom lived to be more than sixty years old, he has a good recollection, supplemented by letters, memoirs, and portraits. He then noted in his subject 'A' sixty-four characteristics, of which he found sixty-three in one or both his parents. He extended his observation to thirty other individuals belonging to sixteen families; and in the entire group of thirty-one persons he was able to enumerate 1,032 characteristics of which he was able to state their presence or

Histoire des sciences et des savants depuis deux siècles. Par Alphonse de Candolle. Deuxième édition, considérablement augmentée. Genève-Bale, *Georg*, 1885. 594 p. 8°.

absence among the parents of the individual studied. The results of this inquiry are tabulated. To illustrate what he means by characteristics, the author cites three famous men whose lives are well known, and mentions their dominant traits, — Louis XVI. (fifteen characteristics), Napoléon Bonaparte (thirty-seven characteristics), and Charles Darwin (twenty-nine characteristics). All this part of his essay is full of interest.

His conclusions are these : —

1. Heredity is a general law which admits but few exceptions.

2. The interruption of heredity through one or more generations (atavism) is rare, perhaps five or ten times in a hundred.

3. The more remarkable a person is for good or ill, the more numerous and pronounced are his characteristics.

4. Women show fewer distinctive characteristics than men.

5. All groups of characteristics are more likely to be transmitted by fathers than by mothers.

6. It is difficult to determine whether characteristics which have been acquired by education and other external circumstances are transmitted by heredity.

7. The most marked characteristics in an individual are generally those received from both parents, especially those received both from parents and other progenitors.

The main portion of the volume, in the second as in the first edition, is a study of what might be called the origin and distribution of scientific men during the last two centuries. The author's views are based upon the selection of foreign members by three great academies, — in London, 1750–1869 ; Paris, 1666–1883 ; and Berlin, 1750–1869. As a rule, these associations bestow the honor of foreign membership, from time to time, upon men of all countries, and of all departments of study, who have exerted most influence upon the progress of science by their publications. Such elections may be regarded as indications of impartial judgment respecting merit ; and, although there may be errors or prejudices, he believes that the aggregate lists include the names of those most worthy to be honored for their scientific investigations. From the facts thus collected he points out the proportion of mathematicians and naturalists at different epochs ; the increasing devotion to a single subject ; the rarity of feminine contributions to the progress of science ; the social classes from which *savants* come ; special influences which affect the number, the studies, and the successes of scientific men ; national distribution of scientific leaders. Many valuable comments follow on the outlook of modern science, and the favorable and unfavorable influences which are at work. Toward the close of the volume, there is given an investigation (which was only approached in the first edition) respecting the academic recognition of men devoted to the moral and social sciences.

"The secret workings of nature which bring it to pass that an Aeschylus, a Lionardo, a Faraday, a Kant, or a Spinoza is born upon the earth, are as obscure now as they were a thousand years ago." These are the words with which Pollok introduces his life of Spinoza, and they have occurred to us after a perusal of the book we have described. The origin of genius or of talent is as fascinating an inquiry as the origin of species. But there is something in the intellectual or spiritual nature of man which eludes analysis, and hides itself from the most penetrating researches of the psychologist and the physiologist. Nevertheless, a volume so full of learning, so sparkling with bright ideas, so controlled by scientific habits, is a thought-inspiring book, for which every one must be grateful, even if it serves only as an introduction to an unexplored continent.

DR. HACK TUKE ON HYPNOTISM.

DR. HACK TUKE can hardly be said to have written a book on sleep-walking and hypnotism : it is a collection of papers which are full of repetition, and which are written in a style that is decidedly undress. But hypnotism is at present such an interesting subject, that any exact information about it is very welcome. The author's main object is to point out the resemblance between natural and induced somnambulism, which latter term he uses as another name for hypnotism, and to call attention especially to the former mode of aberrant mental action as an important aid to the study of mind. His own article on natural somnambulism, based on answers to a circular sent out six years ago, contains little that was not known before ; but his examination into the mental condition of the hypnotic subject is of greater interest. He finds that consciousness may persist, or that it may pass rapidly or slowly into complete unconsciousness ; the manifestations are not dependent upon its presence or absence. One subject, Mr. North,

Sleep-walking and hypnotism. By D. HACK TUKE, M.D., LL.D. London, *Churchill*, 1884. 6 + 119 p. 8°.

lecturer on physiology at Westminster hospital, says of himself at first, "I was not unconscious, but I seemed to exist in duplicate; my inner self appeared to be thoroughly alive to all that was going on, but made up its mind not to control or interfere with the acts of the outer self;" and later, "I knew perfectly well that I was playing the fool, i.e., that my outer self was doing so, the inner self looking on, too idle to interfere;" and later still, "Here I appear to have been absolutely unconscious for some moments." Another subject says, "Mr. Hansen told me that my hair was on fire. I touched my head, and saw that he was wrong. He then told me to put my head into cold water, directing me at the same time to a gas-burner. I felt it was not water: I felt the heat, but yet I could not refuse putting down my head and trying to wash it." Voluntary control over thought and action is suspended; reflex action of the cerebral cortex, in response to suggestions from without, comes into play; and, so long as consciousness is retained, the perception of this automatic cerebral action conveys the impression of a dual existence. Dr. Tuke's theory of the hypnotic state does not differ from that of Haidenhain: he holds that part of the cerebral cortex is exhausted by prolonged and monotonous excitation of certain sensory nerves, and that other parts, unexhausted, respond all the more acutely to stimulation. Whether hypnotism is injurious to the subject, or whether it has any therapeutic action, are questions that remain undecided. Mr. North found, after the third and last experiment tried upon him, that any exercise of close attention tended to bring on the same sensations as those which ushered in the hypnotic sleep.

From observations made upon patients at the Salpêtrière who were subject to hysteria major, Charcot and Richer were led to distinguish three distinct forms of hypnotism, — the cataleptic, the lethargic, and the somnambulistic. The last is the form which bears the closest resemblance to the ordinary mesmeric trance. In the cataleptic state, the limbs of the patient remain for a long time, and without effort, in any position in which they may be placed; in the lethargic the muscles are relaxed, but they contract strongly and definitely under gentle mechanical stimulation (*hyperexcitabilité neuromusculaire des hypnotiques*, first observed by Mr. Charcot in 1878). The lethargic subject may be made cataleptic by simply pulling open the eyelids and exposing the eyes to a bright light: closing the eyes is sufficient to put him back into the condition of lethargy. But, what is most remarkable, if one eye is kept open and the other shut, the singular phenomenon is witnessed of an individual divided into two parts by the median plane. One half of the body, that which corresponds to the closed eye, presents the muscular susceptibility characteristic of the lethargic state: the other, corresponding to the open eye, is in a condition of catalepsy. Mr. Charcot very properly says, that to suppose that an ignorant person, exposed for the first time to this experiment, should be able to invent such an extraordinary phenomenon as this, would be 'truly childish.' But, besides this presumption, he has an infallible method of detecting simulation. A very vigorous person, not hypnotized, can keep his arm extended as long as the cataleptic; but it is useless for him to try to pretend that it does not fatigue him. The operator has only to attach a pneumograph to his chest. The tracing which registers his respirations soon discloses great irregularity in their rhythm and their volume, and in this way his own muscles are forced to write down the evidence of his attempted deception.

The experiments of Charcot and Richer (*Archives de neurologie*) are conducted with a carefulness and ingenuity which should recommend them as models to the American society for psychical research.

INHERITANCE AMONG THE ANCIENT ARABS.

IN the study of Roman law the institution of agnation is discovered. By it descent and inheritance are in the male line. Among most of the tribes of North America, Morgan has shown that uterine descent and inheritance are established by law. In the study of these forms of descent among various peoples of the earth, Morgan came to the conclusion that uterine descent is everywhere the characteristic of primitive society; that it is primordial in savagery; and he attempted to account for the change from female to male descent.

There is yet another institution set forth in Roman law, called cognation, which is descent and inheritance in the male and female lines, and which is found more fully developed in the institutions of modern civilization.

Since Morgan's writings were published, the universality of uterine descent, or mother-right (*mutterrecht*), in primitive society, has been affirmed and denied by various writers; but

Das matriarchat (das mutterrecht) bei den alten Arabern. Von G. A. WILKEN. Leipzig, *Schulze*, 1884. 72 p. 8°.

altogether the evidence to the correctness of his views has steadily accumulated, until it is now almost overwhelming.

Mr. Wilken takes up this subject for the purpose of showing that mother-right once existed among the Semitic nations, especially among the ancient Arabs. The evidence adduced seems to fully warrant the conclusion. In connection with the main purpose of his paper, two subsidiary questions are discussed. The first relates to communal marriage; the second, to exogamy and endogamy.

With respect to communal marriage, the author is not clear in his conception of the nature of the institution. It is the marriage of a group of men (brothers) to a group of women (sisters). Sometimes the group of men is small; and a man may have no brothers, and still be entitled to a group of women for his wife. This is sometimes denominated 'hetarism,' and must be distinguished from polygamy, which is altogether a later institution. Sometimes the group of women may be small: in fact, a woman may have no sisters; in which case a number of men would have but one common wife. This is called 'polyandry.' Our author endeavors to find evidence, among the Arabs and other Semitic peoples, of communal marriage; but most of the evidence which he brings forward is not pertinent to the argument. The 'survival' of institutions analogous to 'atavism' in biology is a principle of great value to the student of early society, but it must be used with great care. Wilken describes the institution of mot'a, which is marriage for a limited and prescribed time, and other sexual practices among the nomadic tribes, and cites them as survivals of communal marriage from prehistoric times; but such practices, though they may be partially regulated and ameliorated by law, give no evidence of a more ancient institution, but rather show that in all times men have disregarded institutions, and broken laws, and have thus lapsed into immorality. Robbery still exists in the highest stages of civilized society, but furnishes no evidence that stealing was originally established by law, so as to constitute a prehistoric institution. Murder is still committed, but this does not permit us to infer that primitive mankind practised murder as a legalized institution. The various forms of hetarism practised in historic times among all peoples, like robbery, murder, and other crimes, testify to the fact that the passions of men are but imperfectly controlled by the regulations of society.

The author brings forward many instances and divers reasons for believing that exogamy formerly existed among the Arabs, and that it was finally changed into endogamy. On this subject the author seems to think that the evidence is contradictory, and he tries to draw an average conclusion therefrom. The contradictions, however, are not in the facts themselves, but in the author's misconception of the facts upon which theories of exogamy and endogamy have been based. His first great error is in using the term 'tribe' in different senses, as does McLennan and other writers of that school. They seem to think that the tribe is a group of people held together by the authority of some one person, — by a chief. Now, in fact, no tribe has yet been discovered organized on a plan so simple. All tribes are composed of two or more groups, each of which has an organization, and constitutes an integral part of the tribe. In many cases there are tribes with three, four, five, or even six units of organization of different orders. Sometimes the term 'tribe' is used to designate the unit of the highest order, — the whole body of the people; sometimes it is used to designate a clan or gens within the tribe; and again it is used to denote a sub-gens, or even a smaller group. The use of the term 'tribe,' or its synonyme in other languages, in this manner, has led to many errors, and apparently conflicting statements, in relation to the organization of early society. In all such tribes throughout the world, there is invariably some group of persons within which a man may not marry, and in respect to which he may be said to be exogamous; and yet he always has a right to marry somewhere within the larger group here denominated 'tribe:' hence, in relation to the tribe, he is endogamous. Every man, in all stages of society, is exogamous in relation to some group; that is, it is incest to marry within such group. In like manner, he is endogamous to some other or all other groups. Thus it is that every man, throughout savagery, barbarism, and civilization, is both exogamous and endogamous.

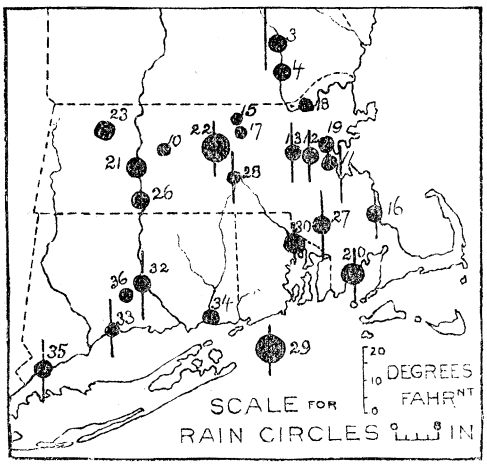
The author has the unfortunate practice of using the term 'matriarchy' (*matriarchat*) for the term 'uterine descent,' and 'patriarchy' (*patriarchat*) as a name for agnatic descent. The term 'patriarchy' has long been used for another purpose; that is, for the name of the organization of the social unit in which the father is the chief or ruler of his sons and sons' families, — a group of descendants, — and is in important particulars the owner of the common property. This patriarchal society is well described in the post-Noachian history

of the Bible, and the institution thus found has been taken as a type of that discovered in other parts of the world. Agnatic descent is one of the characteristics of patriarchy, but it may exist under states of society where the patriarchy does not exist; and to use the term 'patriarchy' as synonymous with agnation can but lead to confusion. Then, by analogy, he uses the term 'matriarchy' to signify descent in the female line, and the confusion is still worse; for, so far as we know, the mother is never the ruler of the clan, where uterine descent is established. In some cases the ruler is the uncle. The etymology of the term 'patriarchy,' and customary use, alike imply chieftaincy. The terms 'agnatic descent' and 'uterine descent' have no false implication, and properly express the facts.

J. W. POWELL.

NOTES AND NEWS.

THE New-England meteorological society, of which brief mention has been made in earlier numbers, has now advanced far enough to issue for November the first number of its monthly bulletin. This summarizes the results of thirty-six stations, mostly maintained by volunteer observers, comparing them with records of previous years in a tabular



RAINFALL AND RANGE OF TEMPERATURE IN SOUTHERN NEW ENGLAND FOR NOVEMBER, 1884.

numerical statement, and presenting data concerning precipitation, and range of temperature, in a sketch-map, the southern half of which is here reproduced. Measures of rain and melted snow are represented by black circles, while the mean daily range of temperature is indicated by vertical lines. Scales for the reading of both are added in the margin. The small size of the map gives it the appearance of being fairly well supplied with stations; but in reality they are as yet much too far apart to furnish satisfactory basis for studies of a detailed character. Even around Boston, where the greatest density of observation is found, there is need of additional observers before the society should consider its list of stations sufficiently extended; and elsewhere in New England the showing now made must be considered only the beginning of what should be accomplished a year or two hence. The bulletin states that all matters of observation should be addressed to Professor Winslow Upton, Providence, R.I.

— The Bureau of navigation of the navy department reports that a hundred and forty-five compasses with the four-needle card have been issued to ships during the past year, and that they have given general satisfaction, the behavior of the improved compasses used by the Greely relief expedition in high latitudes being especially commended. This expedition gathered considerable data concerning the variation of the compass in high latitudes; but, owing to its speedy return, none were obtained concerning the magnetic force and dip. The data concerning compass variations, collected by the department during the past year, are in course of preparation for publication. Professional paper No. 17, entitled the 'Magnetism of iron and steel ships,' is in press; and No. 18, on 'Deviations of the compass in U. S. naval vessels,' is nearly ready. Preparations have been made for a careful examination of the magnetic character of the new steel vessels, and a compass station is to be established in Narragansett Bay. The instruments for a compass testing-house are now in the possession of the bureau, and a building will be erected when the appropriation is made. In view of the probable necessity of compensating the compasses of these new vessels, a binnacle has been designed in the bureau for this purpose, and it will be placed in the Dolphin to be tested.

— Old residents of the California peninsula have noticed several varieties of birds near the seacoast that they have never before known to leave the mountains. This is supposed to indicate a severe winter, but the migration is more probably due to the prevailing scarcity of all kinds of seeds in the mountains this season.

— A complete outfit, consisting of Mangin's projectors, Gramme dynamos, Brotherhood engines and accessories, has been ordered for each of the new U. S. cruisers for use as search-lights. The dynamos and motors are to be mounted on one bed-plate, the engines being connected directly. The projectors will be furnished by Sautter, Lemonnier, & Co., of Paris, and the engines by Peter Brotherhood of London.

— The University of Pennsylvania has rented one of the tables at Dohrn's zoölogical station, so that the United States is again represented at the Naples laboratory.

— Under the title 'Micro-palaeophytologia formationis carboniferae,' Dr. P. F. Reinsch of Erlangen

proposes to issue a work in two volumes, in which are described and figured many microscopic forms resembling the spores of higher cryptogams, but which the writer considers to be independent unicellular organisms. They appear to have been very abundant in the carboniferous period, when higher cryptogams were the prevailing vegetable type. Dr. Reinsch offers to furnish to purchasers of his work duplicate specimens of some of the species described.

— A second edition of Dr. Lant Carpenter's 'Energy in nature' has just been published in England.

— According to *Nature*, the collections made by the polar traveller, Capt. Jacobsen, by order of the Berlin museum, on his American tour, are now on view at the Royal ethnographical museum at Berlin. That part of the collections which was obtained from Alaska territory consists of some four thousand objects, collected among various Eskimo tribes, and among the Ingalik Indians living on the Yukon River. Most of the objects in question closely resemble those dating from the stone age, consisting principally of stone, bone, horn, shell, or wood.

— The *Athenaeum* states that Consul O'Niell has this year accomplished two remarkable journeys in an unknown portion of East Africa. In the first he left the river Shire at Chironzi, and walked to Blantyre, leaving the Ma-Kalolo country on his left. In the second he walked to Guillimani, on the coast, from Blantyre, by a route leading south of Milanji, which will prove to be the nearest and most direct overland communication with the coast. He took twelve hundred observations for longitude, which will help to fix a trustworthy meridian in the interior, which has been much wanted. The account of these journeys will appear in the Proceedings of the Royal geographical society.

— The International Paris exhibition of manufactures and processes will be opened on July 23, 1885, and closed on Nov. 23. The exhibition will be held at the Palais de l'industrie, Champs Elysées, under the patronage of the minister of commerce and the minister of public works.

— From *Nature* we learn that the expedition of the German travellers, Dr. Clauss and Herr von den Steinen, who undertook to investigate the tributaries on the upper right bank of the Amazon and Xingu Rivers, starting from Paraguay and Cuyaba, have successfully accomplished this task, and safely arrived at Para at the end of October. The Brazilian government, and especially Senhor Batovi, the prefect of the province of Matto Grosso, have supported this scientific undertaking in a praiseworthy manner.

— At a meeting of the Anthropological institute of Great Britain, held on Nov. 11, Mr. Francis Galton described the object, method, and appliances of the late anthropometric laboratory at the International health exhibition, reserving the statistical results, which were not fully worked out, for another occasion. 9,344 persons passed through the laboratory, each of them being measured in seventeen distinct particulars for the sum of threepence, in a compartment only six feet wide and thirty-six feet long. So many applications have been made abroad and at home for duplicates of the instrumental outfit, that it was deemed advisable that any suggested improvements in it should be considered before it became established in use.

— Dr. Siemens of Berlin has offered the German government a piece of land in Charlottenberg worth $100,000, for the building of an Institute of mechanical and physical science. Preliminaries are already being arranged by Dr. Forster and Professor Helmholtz.

— Bulletin No. 6 of the U. S. geological survey is 'Elevations in the Dominion of Canada,' by J. W. Spencer, now at the university at Columbia, Mo., lately of King's college, Windsor, Nova Scotia. During his studies of Lake Ontario, Professor Spencer collected the altitudes along all the Canadian railroads constructed up to 1882; and these are now published in convenient form. The tables occupy thirty-three octavo pages, first arranged by railroads, followed by a selected alphabetical list. The altitudes are referred to mean ocean-level.

— Professor Paulitschke left Vienna on the 30th of November for eastern Africa. He proposes, in case access to Harar should be denied him, to explore some of the least-known districts of southern Abyssinia.

— *Petermann's mittheilungen* publishes the report of an excursion into the Somal country by J. Menges, one of the hunters employed by Carl Hagenbeck of Hamburg, the well-known dealer in wild animals. The explorer succeeded in reaching the plateau sixty miles to the south of Berbera, where its altitude is fifty-one hundred feet. He was disappointed in the ruins of stone houses promised him on the coast; such remains of buildings as he found being, to all appearance, due to the Galla, who formerly inhabited this country. A valuable map accompanies the report.

— Recent deaths: Dr. L. Fitzinger, formerly keeper of the Vienna museum, Sept. 22; Dr. Thomas Wright of Cheltenham, geologist, Nov. 17; Mr. R. A. Godwin-Austen, the geologist, Nov. 25, at his residence, Shalford House, Guilford, Eng.; Mr. Henninger, one of the editors of *Science et nature*.

— *Nature* states that Admiral von Schleinitz has resigned the presidency of the Berlin Gesellschaft für erdkunde, and has been replaced by Dr. W. Reiss. At the last meeting of this society it was stated that there are now four polar expeditions in preparation, of which one will start for the antarctic regions. The African traveller, Dr. Aurel Schulz, has started on a journey across Africa from east to west, by way of the Zambesi River and the Victoria Falls. Lieut. Schulz, the leader of the German-African expedition, reports from Cameroon that the joy of the German colonists there is most intense in consequence of recent political events.

— The course of lectures to graduate students at the Johns Hopkins university, which was opened on the 15th of November by President Gilman on academic degrees, will consist of the same number (twelve) as last year. Dr. G. Stanley Hall followed President Gilman with a lecture on student life. The other

lectures are by S. Newcomb, Mathematics and education; J. Rendel Harris, On the study of ancient manuscripts; W. K. Brooks, The zoölogical significance of education; M. Warren, Application of the historical method to the study of Latin; R. T. Ely, Educational value of political economy; M. Bloomfield, Method of comparative philology as pursued to-day; E. M. Hartwell, Physical training in American colleges; A. M. Elliott, Methods in the study of modern languages; W. E. Story, Methods of teaching arithmetic; T. Craig, Mathematical teaching in France.

— A statue of Claude Bernard is to be placed at the top of the grand staircase of the Collége de France. It will be the work of Guillaume, whose sketch in plaster was erected on the site intended for the work when completed.

— Professional paper xiv. of the signal-service, entitled "Charts of relative storm frequency for a portion of the northern hemisphere," by John P. Finley, is just issued. It gives one annual and twelve monthly charts, which show the "distribution of tracks of centres of barometric minima over North America, the North Atlantic, and Europe," based on observations of the last twenty years. The annual chart, for example, explains at a glance why the region around our great lakes has so much more variable a climate than that of central Europe. With us, every rectangle bounded by two and a half degrees of latitude and longitude, from Minnesota to Maine, is visited by from twelve to fifteen storm-centres a year; France and central Germany have less than three on corresponding areas; even Great Britain and most of Norway have not more than six. The chief appreciation of the paper will be found, however, among navigators of the North Atlantic, as the principal object sought was the study of Atlantic storm-tracks, whose relative frequency is now shown graphically for the part of the ocean most commonly traversed. The execution of the maps by the signal-office lithographers is by no means satisfactory.

— The second annual convention of the Modern language association of America was held at Columbia college on the 29th and 30th of December. The modern pedagogic claims on instructors are fairly recognized by the titles of papers which were read, and of the subjects which came up for discussion, some of which were the following: How far may the latest scientific results be embodied in the text-book? by Prof. H. C. G. Brandt of Hamilton college; The modern language question, by Prof. A. M. Elliott of Johns Hopkins university; What place has Old-English philology in our elementary schools? by Prof. Francis B. Gummere of New Bedford, Mass.; Would it be desirable to allow the substitution of one modern in place of one ancient language for admission to college? What amount of modern language study should be regarded as an equivalent for Greek? The extent to which purely scientific grammar should enter the instruction of ordinary college classes; A uniform pronunciation of Latin ought to be adopted in American colleges, and the Roman recommended.

— The January *Century* contains an article on the National museum from the pen of Mr. Ernest Ingersoll, admirably illustrated. Our readers will be very much interested in it. We wish that some modifications might have been made in the introductory sentences, which seem to us to do scant justice to the past. Mr. Ingersoll develops the grandeur of the scheme of the museum with lavish hand; and it would appear as if, were the plan to be carried out in detail, the District of Columbia would not be large enough to hold the museum.

— A special despatch to the Philadelphia *Times* from Washington, condemning the report of the National academy of sciences concerning the reorganization of the different scientific bureaus of the government, and endeavoring to set forth the certainty of Mr. Cleveland's antagonism to the government scientific surveys when he shall have become installed as president, has given occasion to an excellent reply in the *Times* for Dec. 21, from Mr. Charles A. Ashburner of the Geological survey of Pennsylvania, in which he says that the views expressed by Gov. Cleveland in his veto of the appropriations for the New-York state survey last year "do not necessarily indicate his position in regard to the appropriations which shall be made by congress during his term of office for the support of the geological survey. If he shall view this matter from a practical business stand-point, he will no doubt conclude, as others have who thoroughly understand the subject, that the results of the U. S. geological survey are of immediate practical importance, and that such government surveys in the past have had much to do with the great material advancement of the states. The importance of geology as an aid to the discovery, exploration, and exploitation of mineral deposits is acknowledged by intelligent persons; and there is scarcely a civilized government that does not recognize the fact by giving liberal appropriations in support of official geological surveys or by government aid to special geological investigation."

— Prof. Pliny E. Chase of Haverford college, Pennsylvania, who for several years past has been publishing in the Transactions of the American philosophical society the result of his, to say the least, recondite researches on the cosmic influences of harmonic waves, has lately prepared a small work, in two parts, on the 'Elements of meteorology' (Philadelphia, *Porter & Coates*, without date). Although one of the objects in view in its preparation was to provide a 'simple introductory text-book,' we cannot find that this has been realized. Even on the pages devoted to subjects that may be called orthodox, logical arrangement, precise definition, and sufficient explanation are wanting; while other pages, whose topics are, again to say the least, very heterodox, do not seem to us to furnish suitable material for the use of teachers in common schools. It is an unpleasant task to condemn a book, but justice to our readers requires that this one should be characterized as not representing the generally approved principles of meteorology of the present day.